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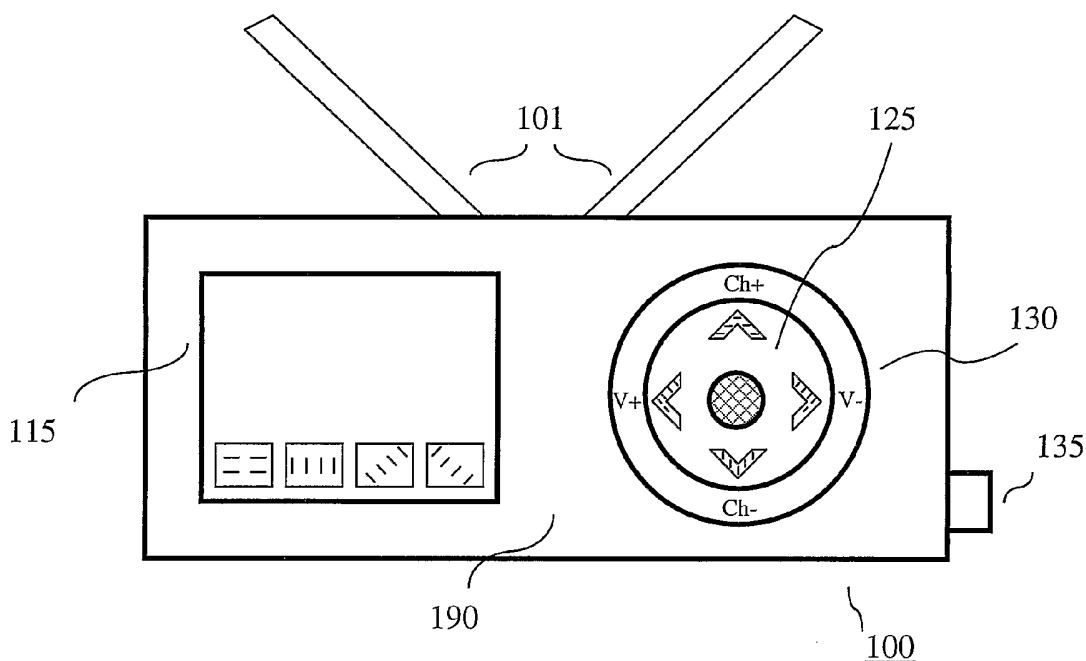
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(54) Title: BI-MODAL SWITCHING FOR CONTROLLING DIGITAL TV APPLICATIONS ON HAND-HELD VIDEO DEVICES



(57) Abstract: A portable digital television (DTV) comprises a processor and a navigational button arrangement. The processor of the portable DTV controls the navigational button arrangement to have at least a bi-modal operation. In one mode of operation, the navigational button arrangement provides a navigational interface to a user and, in another mode of operation, the navigational button arrangement provides an interactive application interface to the user.

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BI-MODAL SWITCHING FOR CONTROLLING DIGITAL TV APPLICATIONS ON HAND-HELD VIDEO DEVICES

BACKGROUND OF THE INVENTION

5 [0001] The present invention generally relates to user interfaces and, more particularly, to a user interface for a hand-held video device.

[0002] In a television system conforming to the Digital Video Broadcasting (DVB-T) Standard found in Europe (e.g., see ETSI EN 300 744 and other associated documents) interactive applications may be present. In this regard, a remote control for a digital television
10 (DTV) typically comprises a set of navigation keys and a set of function keys. The set of navigation keys, or buttons, are used to traverse an electronic programming guide (EPG) and/or a menu tree displayed on the DTV and typically comprise five buttons representing such common operations as "up ", "down ", "right ", "left " and "select". In comparison, the function keys are used for the interactive application and typically comprise at least four
15 buttons, each button associated with a particular color. For example, one button is colored red, another green, a third blue and the fourth yellow. (It should be noted that a fifth button is reserved for future use and is denoted by the color purple.) As such, the interactive application may provide "soft labels" on the picture displayed on the DTV, each label textually describing a different function and having one of the four colors. For example, an
20 interactive application may cause to be displayed a soft label with the text "go back" and having a red background. A user would then know that pressing the red-colored function key on the remote control would correspond to performing the "go back function" for the interactive application.

SUMMARY OF THE INVENTION

25 [0003] I have observed that the use of a set of navigation keys and a set of function keys in a DTV environment presents a problem in the construction of a portable DTV that supports interactive applications. In particular, the portable DTV must either provide enough physical space for at least ten buttons somewhere on the portable DTV (five buttons for the navigation interface and five buttons for the interactive application interface), or require packaging of a
30 remote control (with the above-noted requisite number of buttons) along with the portable DTV. Therefore, and in accordance with the principles of the invention, a navigational button

arrangement has at least a bi-modal operation. In one mode of operation, the navigational button arrangement provides a navigational mode for traversing a guide and/or menu presented on the DTV and, in another mode of operation, the navigational button arrangement provides an interactive application mode for interacting with a DTV application presented to the user. Thus, the portable DTV utilizes five buttons to provide both the navigational interface and the interactive application interface instead of the above-noted ten buttons.

[0004] In an embodiment of the invention, a portable DTV comprises a processor, a display and a user interface. The latter comprises a navigational button arrangement of five buttons having bi-modal operation, five multi-color light-emitting diodes (LEDs) (one LED associated with each of the five buttons of the navigational button arrangement) and a mode button. The mode button enables a user to cause the processor to select either a navigational mode of operation or an interactive application mode of operation for the navigational button arrangement. In the navigational mode of operation, each of the five buttons provides a navigational interface to the user for traversing a guide and/or menu presented on the DTV and the associated LEDs each provide a white light to signify that the navigational mode is selected. In the interactive mode of operation, at least one of the five buttons provides an interactive application interface to the user and the associated LED provides a different color light to signify that the interactive application mode is selected. In particular, the colors in the interactive mode of application are: red, green, blue, yellow and purple. In addition, the colors in the interactive mode correspond to the colors representative of a particular interactive function that are displayed on the display of the portable DTV by an interactive application.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. 1 shows an illustrative portable DTV embodying the principles of the invention;

[0006] FIG. 2 shows an illustrative front view of a portable DTV embodying the principles of the invention;

[0007] FIG. 3 shows an illustrative flow chart in accordance with the principles of the invention;

[0008] FIG. 4 shows an illustration of navigational button arrangement 125 in the navigational mode in accordance with the principles of the invention;

[0009] FIG. 5 shows an illustrative portion of navigational button arrangement 125;

[0010] FIGs. 6, 7 and 8 show illustrations of the navigational button arrangement 125 in the interactive application mode in accordance with the principles of the invention;

[0011] FIGs. 9 and 10 show other views of portable DTV 100 in the navigational mode and interactive application (chromatic) mode; and

5 [0012] FIG. 11 shows another illustrative flow chart in accordance with the principles of the invention.

DETAILED DESCRIPTION

[0013] Other than the inventive concept, the elements shown in the figures are well known and will not be described in detail. Also, familiarity with digital television-based
10 systems is assumed and is not described in detail herein. For example, other than the inventive concept, digital-TV bearing modulated signals, symbol constellations, carrier recovery, interpolation, phase-locked loops (PLLs), a radio-frequency (rf) front-end, or receiver section, such as a low noise block downconverter, formatting and encoding methods (such as Moving Picture Expert Group (MPEG)-2 Systems Standard (ISO/IEC 13818-1)) for
15 generating transport bit streams, decoding methods such as log-likelihood ratios, soft-input-soft-output (SISO) decoders, Viterbi decoders, stored-program controlled processors and buttons for providing a user interface, are well-known and not described herein. In addition, the inventive concept may be implemented using conventional programming techniques, which, as such, will not be described herein. Finally, like-numbers on the figures represent
20 similar elements and at least some of the figures simplify the processing representation and are not drawn to scale.

[0014] An illustrative portable DTV 100 in accordance with the principles of the invention is shown in FIG. 1. Portable DTV 100 comprises antenna 101, DTV receiver 105, DTV processor 110, display 115 and user interface (UI) 120. Illustratively, portable DTV 100
25 conforms to the earlier-mentioned European DVB-T standard. In this regard, DTV receiver 105 receives a DTV signal, via antenna 101. DTV receiver 105 processes the received signal to provide a down-converted signal 106 to DTV processor 110. The latter further processes the down-converted signal to recover therefrom a digital service such as a digital video signal 111 for application to display 115 for viewing thereon by a user. Portable DTV 100 is
30 controlled by UI 120, via signaling path 121, which provides the ability for a user to, e.g., turn-on and off the device, select channels, adjust volume, traverse a graphical user interface (GUI) as represented by an electronic program guide (EPG) and/or a menu (such as for setting

DTV parameters (e.g., video, audio, etc.)) presented on display 115 and provide interactive application data, etc. With regard to interactive application data, DTV processor 110 includes a memory (not shown) for storing therein an interactive application program downloaded via DTV receiver 105. Upon execution by DTV processor 110, the interactive application program provides an interactive application to the user. Known interactive applications are, e.g., weather, news, traffic and games (e.g., Tetris). An interactive application may be associated with a specific channel (e.g., a game channel) or with a program that is currently being viewed. For example, a sports program may also display a colored function key on the screen that, when selected by the user, provides, e.g., additional team information. It should be noted that DTV processor 110 is representative of a processing function and may be implemented in one, or more, stored-program controlled processors (e.g., a microprocessor).

[0015] Turning now to FIG. 2, an illustrative front view of portable DTV 100 is shown. It should be noted that this view is only illustrative, is not to scale, and is merely used to highlight the principles of the invention. Portable DTV 100 is contained within a housing 190. As can be observed from FIG. 2, housing 190 provides support for display 115, user interface 120 and antenna 101. User interface 120 comprises at least a navigational button arrangement 125, a button arrangement 130 and a mode button 135. Although not necessary for the inventive concept, button arrangement 130 illustratively provides the ability for a user to change channels and adjust volume. This is shown in FIG. 2 by the illustrative use of the labels "Ch+" and "Ch-" as indicating the buttons used for incrementing and decrementing a current channel selection; and by the illustrative use of the labels "V+" and "V-" as indicating the buttons used for increasing and decreasing a current volume setting. Likewise, other buttons may be present, e.g., a power button, but these are also not relative to the inventive concept. In accordance with the principles of the invention, navigational button arrangement 125 has at least two modes of operation: a navigational mode of operation and an interactive application mode of operation (also referred to herein as a chromatic mode of operation).

[0016] Reference should now be made to FIG. 3, which illustrates an illustrative flow chart in accordance with the principles of the invention for providing a navigational button arrangement with at least two modes of operation. In step 305, DTV processor 110 sets the mode of portable DTV 100. For example, DTV processor 110 may use mode button 135 of FIG. 2 for setting the mode. In particular, mode button 135 provides an indication of at least

two states. One state is associated with the navigational mode of operation and the other state is associated with the interactive mode of operation. DTV processor 110 will switch modes simply by detecting the current state of button 135. As such, a user can cause DTV processor 110 to switch the modes by simply pressing mode button 135. When the navigational mode is set, DTV processor 110 executes steps 310 and 315. In step 310, DTV processor 110 turns on the navigational mode color (described further below) and, in step 315, processes any signals from navigational button arrangement 125 as navigation signals. On the other hand, when the interactive application mode is set, DTV processor 110 executes steps 350 and 355. In step 350, DTV processor 110 turns on the interactive application mode colors (also referred to herein as the chromatic mode colors) (described below) and, in step 355, processes any signals from navigational button arrangement 125 as interactive application signals and passes them to the particular interactive application program. Thus, portable DTV 100 utilizes five buttons to provide both the navigational interface and the interactive application interface instead of the earlier -noted ten buttons.

[0017] The navigational mode for navigational button arrangement 125 is illustrated in FIG. 4. Portions of navigational button arrangement 125 comprise in effect five buttons: an up button, a right button, a down button, a left button and a select button. These are illustrated in FIG. 4 by corresponding portions 125-1, 125-2, 125-3, 125-4 and 125-5 of navigational button arrangement 125. These portions of navigational button arrangement 125 are also referred to herein as up button 125-1, right button 125-2, down button 125-3, left button 125-4 and select button 125-5. Each button portion comprises at least a partially optically transparent portion, as represented by optical portions 126-1, 126-2, 126-3, 126-4 and 126-5. For the purposes of this description the outer optically transparent portions (126-1, 126-2, 126-3 and 126-4) are in the shape of illustrative direction symbols (\wedge , \vee , $>$, $<$) but the inventive concept is not so limited.

[0018] Turning briefly to FIG. 5, a simplified form of an illustrative block diagram is shown for a portion (e.g., one button, e.g., button 125-4) of navigational button arrangement 125. Navigational button arrangement 125 comprises a circuit board 201, post element 202, optical element 205 and a cover plate 204 having at least a partially optically transparent portion 203 for emitting light from optical element 205 (e.g., corresponding to optically transparent portion 126-4 of FIG. 4). Arranged on both circuit board 201 and post element 202 are corresponding electrically conductive elements (not shown) such that when cover

plate 205 is depressed in the direction of arrow 202, the electrically conductive element of post element 202 makes contact with the corresponding electrically conductive element of circuit board 201 to generate an electrical signal to DTV processor 110 via signaling path 121 of FIG. 1 (not shown in FIG. 5). In addition, circuit board 201 conveys electrical signals to optical element 205 for causing optical element 205 to generate light for transmission through optically transparent portion 203. Optical element 205 is controlled via signaling path 121 of FIG. 1 (not shown in FIG. 5) by DTV processor 110. In accordance with the principles of the invention, optical element 205 is a multi-color light emitting diode (LED) and is capable of providing light in at least two types of colors. For example, optical element 205 may be a bi-color LED, a tri-color LED, etc., as known in the art. For the purposes of this description it is assumed that at least one of the colors capable of being generated by optical element 205 is white.

[0019] Returning to FIG. 4, and as noted above, this figure is representative of the navigational mode of operation. In particular, each optical element of navigational button arrangement 125 is controlled to provide a white color (step 310 of FIG. 3). This is illustrated in FIG. 4 by the lack of a "fill" pattern in each of the optically transparent portions 126-1, 126-2, 126-3, 126-4 and 126-5. As such, the presence of white light associated with all of the buttons of navigational button arrangement 125 is indicative to a user that the navigational button arrangement is in the navigational mode and can be used to, e.g., change channels, adjust volume, etc.

[0020] Referring now to FIG. 6, the interactive application mode is illustrated. A visual comparison of FIGs. 4 and 6 shows that, in FIG. 6, patterns now exist in the optically transparent portions 126-1, 126-2, 126-3, 126-4 and 126-5. These patterns are used herein to represent a color of light other than white. In particular, each optical element of navigational button arrangement 125 is controlled to provide a different color (step 350 of FIG. 3). Illustratively, the horizontal dash "-" associated with up button 125-1 is representative of the color red; the vertical dash "|" associated with down button 125-3 is representative of the color blue, the forward slash "/" associated with right button 125-2 is representative of the color yellow, the backward slash "\" associated with left button 125-4 is representative of the color green and the cross-hatch pattern associated with select button 125-5 is representative of the color purple. (As noted above, the color purple is a reserved color for future use by interactive applications. As such, the color associated with select button 125-5 may also be

kept as white, or the associated optical element may be turned off so that no light is emitted, in accordance with the principles of the invention.)

[0021] The operation of the interactive application mode is further illustrated in FIG. 7. As shown in FIG. 7, navigational button arrangement 125 is in the interactive mode as represented by the above-described "fill" characters. Also shown in FIG. 7 is an illustration of a portion of an image present on display 115 during the application mode. In particular, portions of display 115 represent functions that a user may select. (Not shown in FIG. 7 are the corresponding text labels associated with each of the functions a user may select.) Each function is denoted by a particular color as represented by a particular "fill" character. For example, the horizontal dash "-" associated with display portion 115-1 is representative of the color red; the vertical dash "|" associated with display portion 115-3 is representative of the color blue, the forward slash "/" associated with display portion 115-2 is representative of the color yellow, and the backward slash "\" associated with display portion 115-4 is representative of the color green. In accordance with the principles of the invention, in the interactive application mode there is a correspondence between the colors shown on display 115 and the colors emitted by the optical elements of navigational button arrangement 125. Thus, when colors other than white appear next to a button, the user can detect that portable DTV 100 is in the interactive application mode and that use of the button associated with a particular color will result in that function being selected for the interactive application. For example, if display portion 115-1 also displayed a text label (not shown) entitled "go back," then the user would simply press button 125-1 — also indicated in red — to select that function. As described above, if an interactive application presents less than five functions on the display for selection by the user, then correspondingly navigational button arrangement 125 may be controlled in accordance with the principles of the invention to show all the colors or, instead, only show those colors corresponding to the available interactive application functions. For example, if an interactive application only displays a red function key, then navigational button arrangement 125 may be controlled to show all of the colors (red, blue, yellow, green and purple) or, instead, navigational button arrangement 125 may be controlled such that only button 125-1 is lit with the color red. In this latter case, it is assumed that function key information is provided by the interactive application to DTV processor 110.

[0022] Another illustration of a front view of portable DTV 100 in the interactive application mode is shown in FIG. 8. Likewise, illustrations of user operation are shown in

FIGs. 9 and 10 for the navigational mode and the interactive application mode, respectively. It should be noted that these figures are black and white reproductions of color images.

[0023] Turning now to FIG. 11, another illustrative flow chart in accordance with the principles of the invention is shown. This is an alternative method for configuring portable DTV 100 in either the navigational mode or the interactive application mode. In this example, portable DTV 100 operates in a "sticky mode." In this sticky mode, portable DTV 100 is always in the navigational mode and only switches to the interactive mode for one key (button) press via, e.g., use of mode button 135. In particular, in step 395, portable DTV 100 checks the state of mode button 135 (e.g., via the use of a polling technique or via the use of an interrupt). If mode button 135 has been pressed, then portable DTV 100 enters the interactive application mode in step 350 and turns on the interactive mode colors. In step 355, portable DTV 100 processes the next key stroke on navigational button arrangement 125 in the interactive application mode. Once the next key stroke has been received, portable DTV 100 returns to the navigational mode in step 360 and turns on the navigational mode colors. It should be noted that the method of FIG. 11 can be further modified to include, e.g., a "time out" feature such that if the user does not press a button within a defined period of time while in the interactive application mode then portable DTV 100 reverts back to the navigational mode.

[0024] As described above, and in accordance with the principles of the invention, a navigational button arrangement is used in at least two modes of operation: a navigational mode of operation and an interactive application mode of operation. Thus, only four (if purple is not used) or five buttons are needed thereby reducing the amount of physical space required for a user interface on a portable digital TV. As such, the physical size of a portable DTV may be capable of further reduction since even less space is required for the user interface.

[0025] As such, the foregoing merely illustrates the principles of the invention and it will thus be appreciated that those skilled in the art will be able to devise numerous alternative arrangements which, although not explicitly described herein, embody the principles of the invention and are within its spirit and scope. For example, although shown as separate elements, any or all of the elements may be implemented in one or more integrated circuits (ICs) such as, e.g., a stored-program-controlled processor, e.g., a digital signal processor (DSP) or microprocessor that executes associated software, e.g., corresponding to one or more

of the elements shown in FIG. 1, etc. Further, although described in the context of a portable digital television the inventive concept is also applicable to a remote control for a digital television, etc. Likewise, although a mode button was illustrated in the above description, other methods and mechanisms of setting the mode of the navigational button arrangement
5 may be used. It is therefore to be understood that numerous modifications may be made to the illustrative embodiments and that other arrangements may be devised without departing from the spirit and scope of the present invention as defined by the appended claims.

CLAIMS

1. A digital television, comprising:

a navigational button arrangement arranged to provide a navigational interface to a user and having at least a bi-modal operation;

5 wherein in one mode of operation, the navigational button arrangement provides a navigational mode for traversing a graphical user interface presented on the digital television and, in another mode of operation, the navigational button arrangement provides an interactive application mode for interacting with a digital television application presented to the user on the digital television.

10

2. The digital television of claim 1, wherein the digital television is a portable digital television.

15 3. The digital television of claim 1, further comprising a remote control unit housing the navigational button arrangement.

4. The digital television of claim 1, further comprising optical elements for displaying colors of light on the navigational button arrangement, and wherein in the navigational mode at least one of the optical elements emit light of a first color and in the interactive application
20 mode at least one of the optical elements emit lights of a different color corresponding to a color associated with a particular interactive application function displayed on the digital television.

25 5. The digital television of claim 1, wherein the first color is white and the different colors comprise red, yellow, blue and green.

6. A portable digital television, comprising:

a processor; and

at least four buttons, arranged to provide a navigational interface to a user;

30 wherein the processor controls the four-button arrangement such that in a first mode of operation the four-button arrangement provides the navigational interface to the user and, in a second mode of operation, the four buttons provide an interactive application interface to the

user for interacting with a digital television application presented to the user on the digital television.

5 7. The portable digital television of claim 6, further comprising a mode button that enables the user to cause the processor to switch between the first mode of operation and the second mode of operation.

10 8. The portable digital television of claim 6, further comprising optical elements associated with each of the four buttons; wherein in the first mode of operation the processor causes at least one of the optical elements to provide light of a first color indicative to the user of the first mode of operation and in the second mode of operation the processor causes at least one of the optical elements to provide light of a different color indicative to the user of the second mode of operation, wherein the different color is representative of an interactive application function.

15

9. The portable digital television of claim 8, wherein the optical elements are bi-color light emitting diodes.

20 10. The portable digital television of claim 8, wherein any optical elements associated with a particular button are adjacent thereto.

11. The portable digital television of claim 8, wherein the different colors are red, green, blue and yellow.

25 12. The portable digital television of claim 8, wherein the first color is white.

13. A portable television (TV) comprising:

a navigational button arrangement for use in traversing a graphical user interface presented on the portable TV, the navigational button arrangement comprising at least an:

30 up button;
 down button;
 left button;

right button; and

a select button; and

a number of optical elements such that at least one optical element is associated with each button; and

5 wherein the button arrangement operates in at least two modes, the at least two modes comprising a navigational mode and a chromatic mode, wherein in the navigational mode at least one of the number of optical elements provide light of a first color and, in the chromatic mode, the number of optical elements provide light of at least four colors such that four of the buttons are each associated with a different one of the four colors.

10

14. The portable digital television of claim 13, wherein the four colors are red, green, blue and yellow.

15. The portable digital television of claim 13, wherein the first color is white.

15

16. A method for use in a digital television, the method comprising:

(a) setting a first mode for a navigational button arrangement;

(b) causing a first color to be displayed on the navigational button arrangement, wherein in the first mode the navigational button arrangement is used to traverse a graphical user interface presented on the digital television;

20

(c) setting the navigational button arrangement to a second mode; and

(d) causing at least four different colors to be displayed on the navigational button arrangement; wherein in the second mode the navigational button arrangement is used to interact with an interactive application presented on the digital television, and wherein each of the four different colors are associated with a different interactive function.

25

17. The method of claim 16, wherein the digital television comprises a button having at least two states, one state associated with the first mode and the second state associated with the second mode and further comprising the step of determining the state of the button such that when the state associated with the first mode is detected steps (a) and (b) are performed and when the state associated with the second mode is detected steps (c) and (d) are performed.

30

18. The method of claim 16, further comprising the step of:

(e) returning to step(a) upon selection of a button by a user.

5 19. The method of claim 16, wherein the four different colors are red, green, blue and yellow.

20. The method of claim 16, wherein the first color is white.

AMENDED CLAIMS

[received by the International Bureau on 05 January 2006 (05.01.2006);
original claims 1-20 replaced by amended claims 1-18 (4 pages)]

1. A digital television, comprising:

5 a navigational button arrangement arranged to provide a navigational interface to a
user and having at least a bi-modal operation; and

optical elements for displaying colors of light on the navigational button arrangement;

wherein in one mode of operation, the navigational button arrangement provides a
navigational mode for traversing a graphical user interface presented on the digital television
and, in another mode of operation, the navigational button arrangement provides an interactive
10 application mode for interacting with a digital television application presented to the user on
the digital television; and

wherein in the navigational mode at least one of the optical elements emit light of a
first color and in the interactive application mode at least one of the optical elements emit
lights of a different color corresponding to a color associated with a particular interactive
15 application function displayed on the digital television.

2. The digital television of claim 1, wherein the digital television is a portable digital
television.

20 3. The digital television of claim 1, further comprising a remote control unit housing
the navigational button arrangement.

4. The digital television of claim 1, wherein the first color is white and the different
colors comprise red, yellow, blue and green.

5. A portable digital television, comprising:

a processor;

at least four buttons, arranged to provide a navigational interface to a user; and

optical elements associated with each of the four buttons;

5 wherein the processor controls the four-button arrangement such that in a first mode of operation the four-button arrangement provides the navigational interface to the user and, in a second mode of operation, the four buttons provide an interactive application interface to the user for interacting with a digital television application presented to the user on the digital television; and

10 wherein in the first mode of operation the processor causes at least one of the optical elements to provide light of a first color indicative to the user of the first mode of operation and in the second mode of operation the processor causes at least one of the optical elements to provide light of a different color indicative to the user of the second mode of operation, wherein the different color is representative of an interactive application function.

15

6. The portable digital television of claim 5, further comprising a mode button that enables the user to cause the processor to switch between the first mode of operation and the second mode of operation.

20

7. The portable digital television of claim 5, wherein the optical elements are bi-color light emitting diodes.

8. The portable digital television of claim 5, wherein any optical elements associated with a particular button are adjacent thereto.

25

9. The portable digital television of claim 5, wherein the different colors are red, green, blue and yellow.

10. The portable digital television of claim 5, wherein the first color is white.

11. A portable television (TV) comprising:

a navigational button arrangement for use in traversing a graphical user interface presented on the portable TV, the navigational button arrangement comprising at least an:

5 up button;
 down button;
 left button;
 right button; and
 a select button; and

10 a number of optical elements such that at least one optical element is associated with each button; and

 wherein the button arrangement operates in at least two modes, the at least two modes comprising a navigational mode and a chromatic mode, wherein in the navigational mode at least one of the number of optical elements provide light of a first color and, in the chromatic
15 mode, the number of optical elements provide light of at least four colors such that four of the buttons are each associated with a different one of the four colors.

12. The portable digital television of claim 11, wherein the four colors are red, green, blue and yellow.

20 13. The portable digital television of claim 11, wherein the first color is white.

14. A method for use in a digital television, the method comprising:

 (a) setting a first mode for a navigational button arrangement;
25 (b) causing a first color to be displayed on the navigational button arrangement, wherein in the first mode the navigational button arrangement is used to traverse a graphical user interface presented on the digital television;

 (c) setting the navigational button arrangement to a second mode; and

 (d) causing at least four different colors to be displayed on the navigational button
30 arrangement; wherein in the second mode the navigational button arrangement is used to interact with an interactive application presented on the digital television, and wherein each of the four different colors are associated with a different interactive function.

15. The method of claim 14, wherein the digital television comprises a button having at least two states, one state associated with the first mode and the second state associated with the second mode and further comprising the step of determining the state of the button such that when the state associated with the first mode is detected steps (a) and (b) are performed
5 and when the state associated with the second mode is detected steps (c) and (d) are performed.

16. The method of claim 14, further comprising the step of:
(e) returning to step(a) upon selection of a button by a user.

10

17. The method of claim 14, wherein the four different colors are red, green, blue and yellow.

18. The method of claim 14, wherein the first color is white.

15

FIG. 1

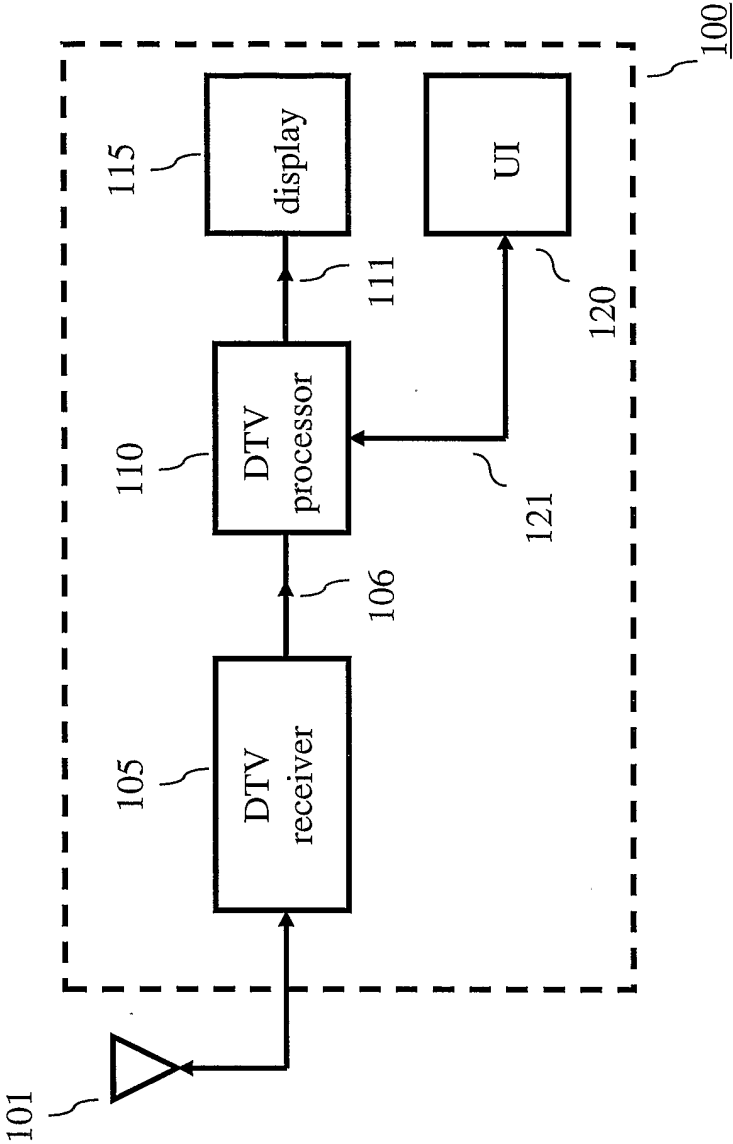


FIG. 2

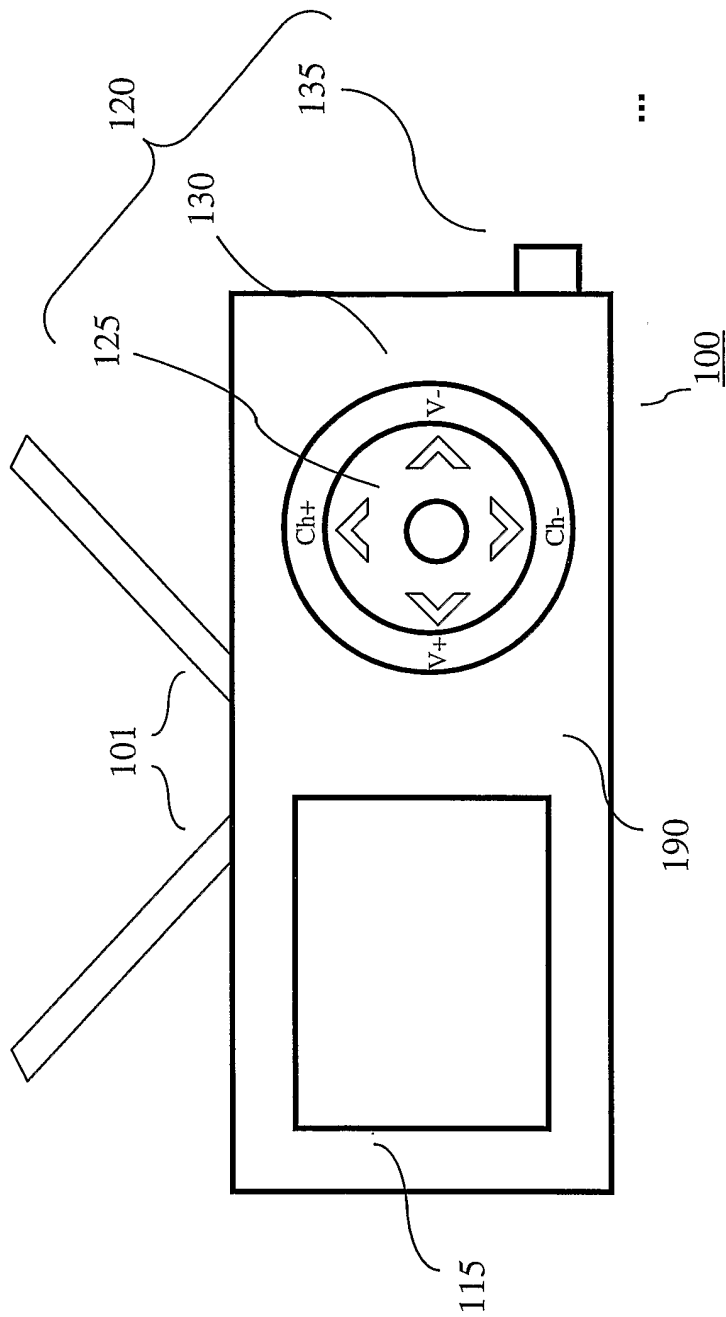


FIG. 3

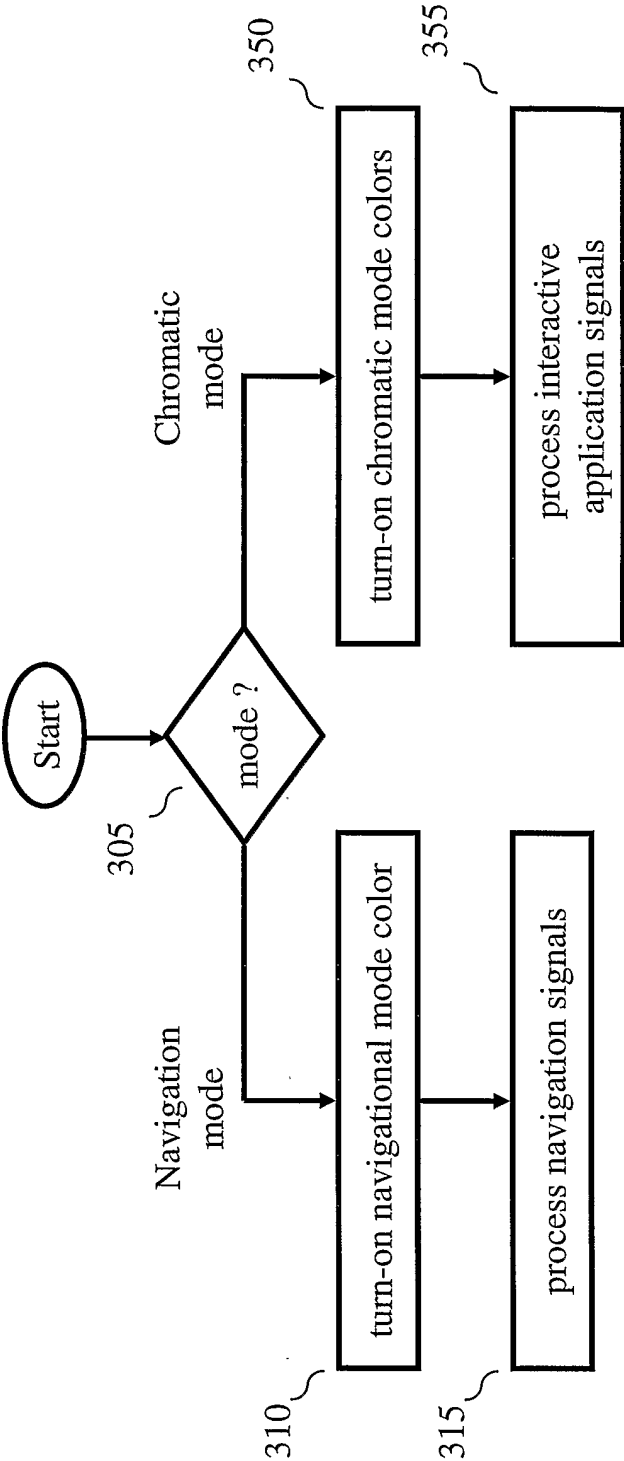


FIG. 4

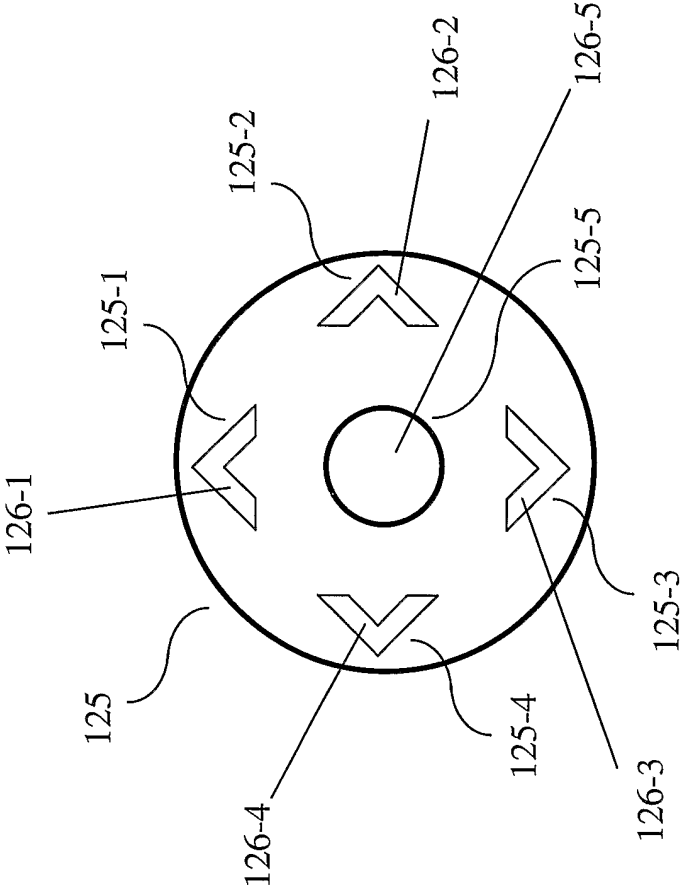


FIG. 5

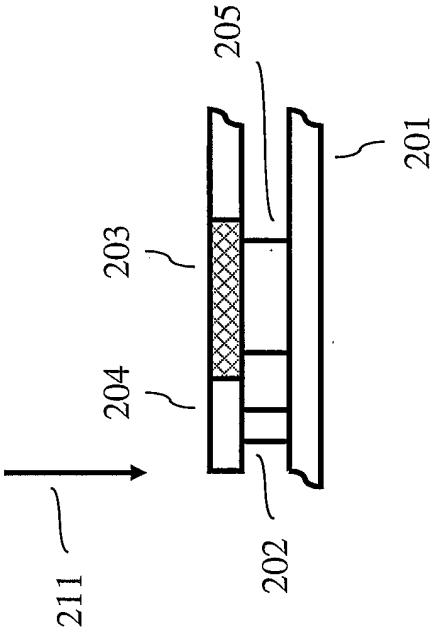


FIG. 6

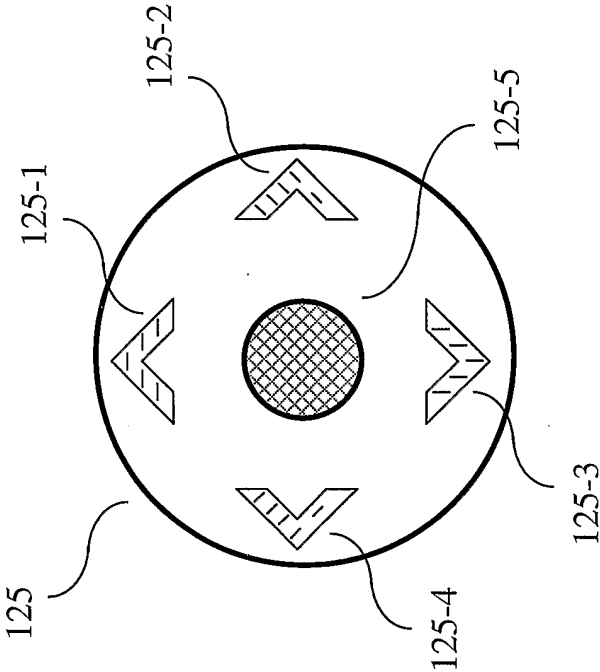


FIG. 7

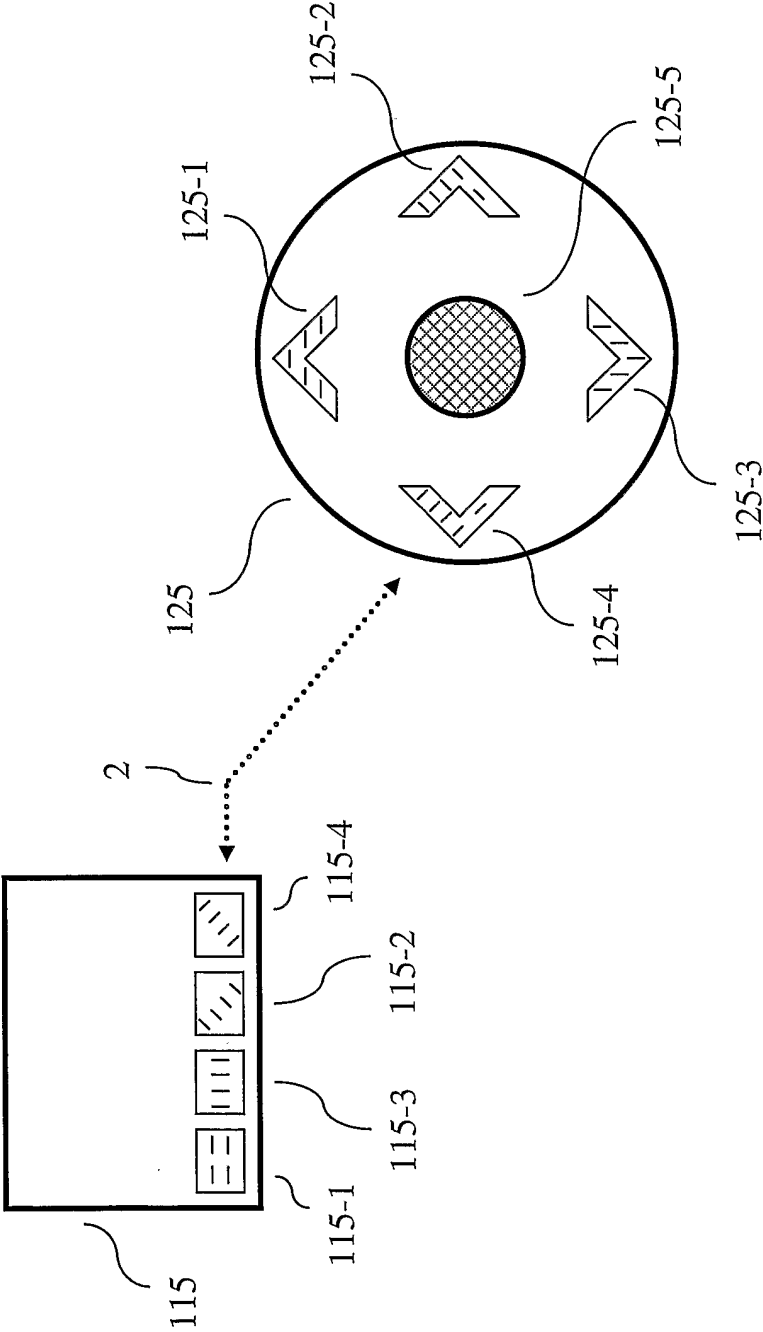
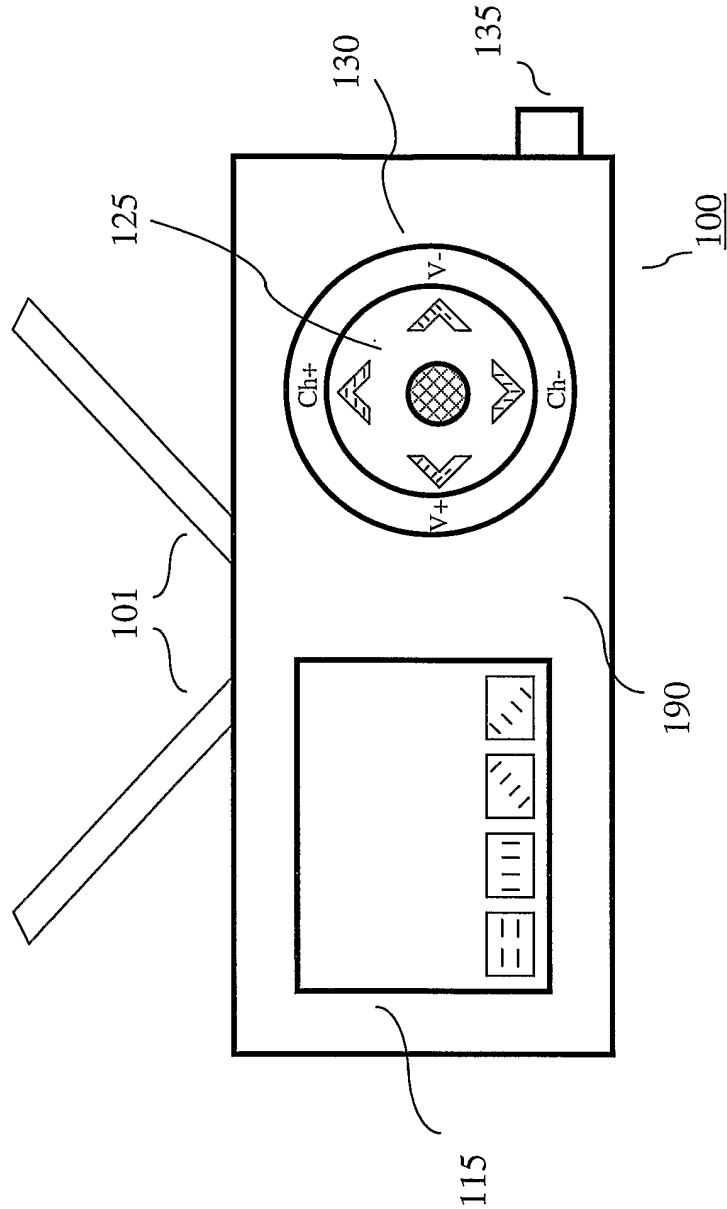
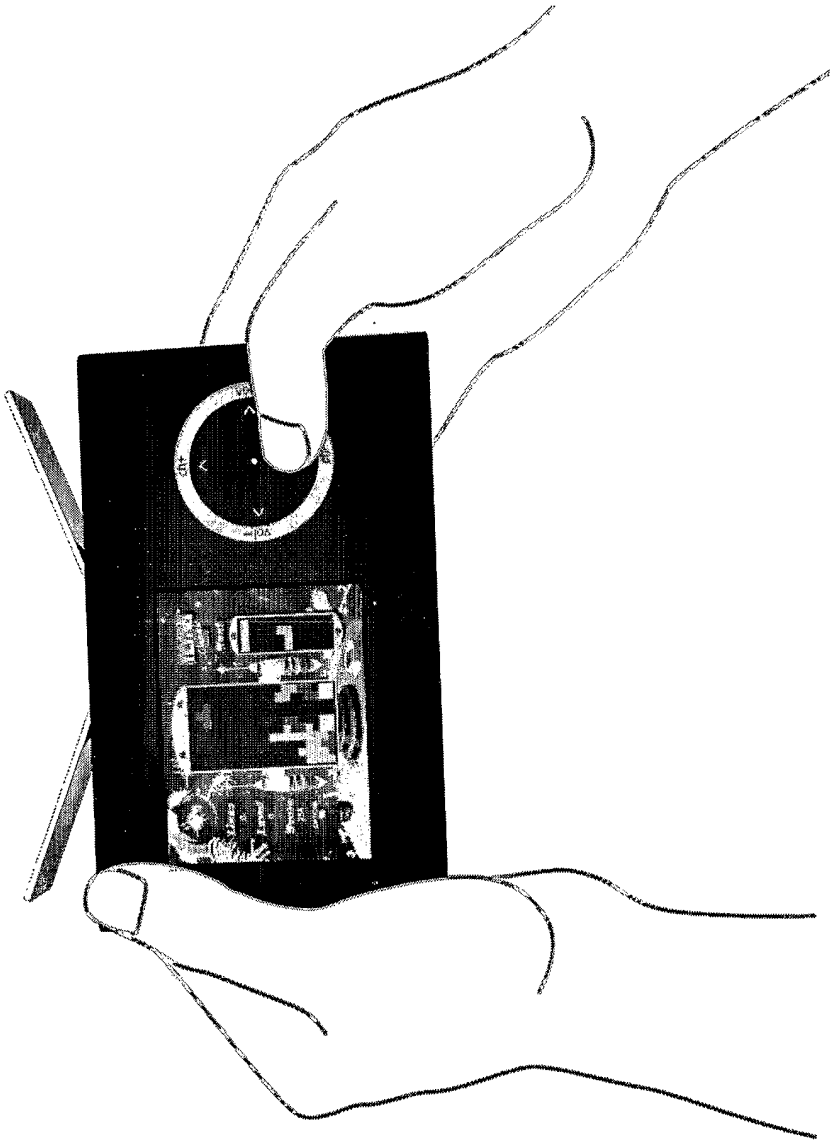


FIG. 8



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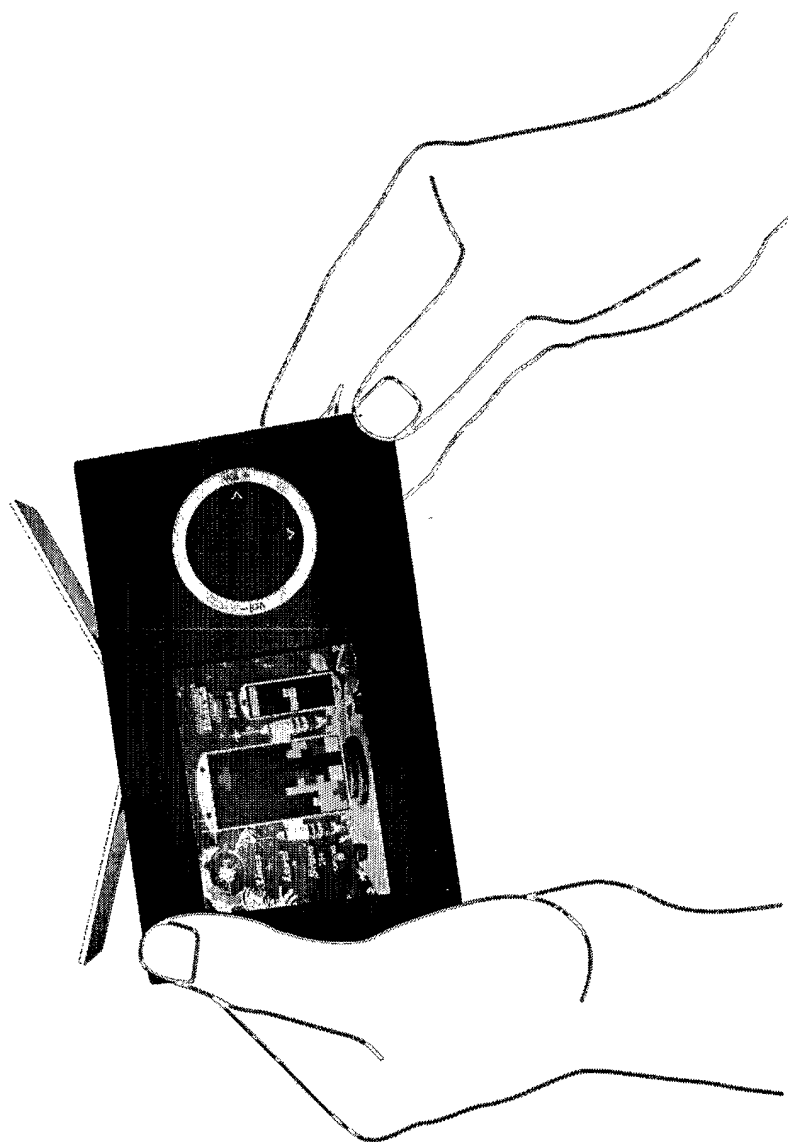
FIG. 9



Navigational Mode (white colors)

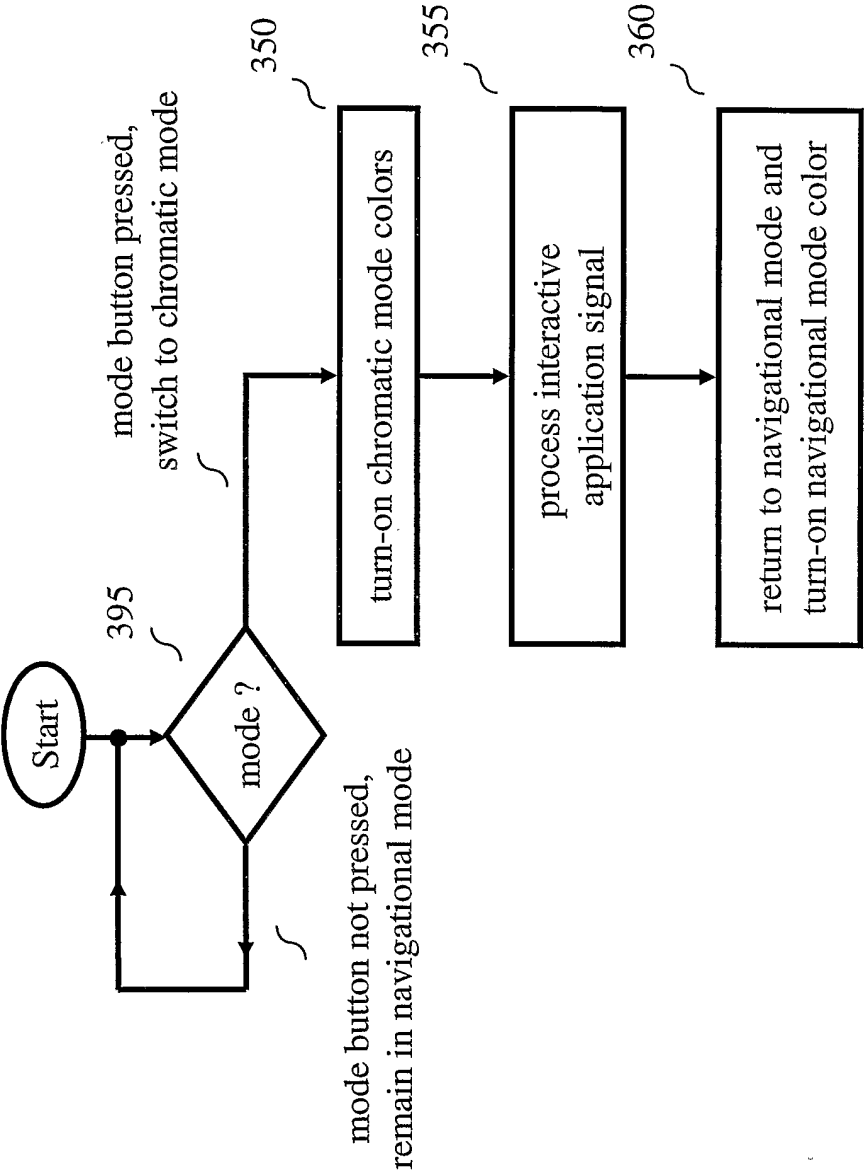
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FIG. 10



Chromatic Mode (non-white colors)

FIG. 11



INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2005/002427

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04N5/445

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04N G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 849 948 A (DISCOVERY COMMUNICATIONS, INC) 24 June 1998 (1998-06-24) page 19, line 25 - page 20, line 30; figures 13A-B	1-5
X	US 2004/107444 A1 (MOON HAN) 3 June 2004 (2004-06-03) paragraph '0076! paragraph '0104!	1-5
A		6,7
A		13,14
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
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- *&* document member of the same patent family

Date of the actual completion of the international search

9 November 2005

Date of mailing of the international search report

21. 11. 2005

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Authorized officer

Brod, R

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US2005/002427

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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X	WO 00/78050 A (UNITED VIDEO PROPERTIES, INC) 21 December 2000 (2000-12-21) page 1, line 4 - page 6, line 11; figures 6,10	1-5
X		6,7
A		8-12
Y		13-15
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Y	paragraph '0045!; figure 5	13-15

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2005/002427

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-5

normal television receiver with bimodal operation

2. claims: 6-12

portable television receiver with processor

3. claims: 13-15

arrangement of navigational buttons and optical elements

4. claims: 16-20

colours for navigational buttons

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2005/002427

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